AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method, comprising:

exposing a photo-sensitive medium to an optical intensity pattern under conditions that inhibits or prevents inhibit or prevent the optical intensity pattern from producing refractive index changes in the medium; and

then, heating the exposed medium to stimulate a pattern of refractive index changes that is responsive to the optical intensity pattern during the exposing.

- 2. (Original) The method of claim 1, wherein the condition includes that a temperature of the medium is lower than a temperature of the medium during the heating.
- 3. (Original) The method of claim 1, further comprising: exposing one or more points or lines in the medium with light that causes photochemical reactions in the medium via multiple-photon absorption events.
- 4. (Original) The method of claim 1, wherein the heating produces the pattern of refractive index changes by causing a chemical reaction selected from the group consisting of polymerization of oligomers, stimulating deprotection of portions of polymers, and stimulating crosslinking of polymers.

- (Previously Presented) The method of claim 1, wherein the medium includes a 5. concentration of molecules that are able to neutralize photo-chemical reaction products produced by the exposing, the products being able to stimulate the chemical reaction that produces the pattern of refractive index changes.
- (Original) The method of claim 1, wherein the optical intensity pattern is produced by 6. interfering at least three mutually coherent light beams.
- (Original) The method of claim 6, wherein the pattern of refractive index changes 7. tracks the optical intensity pattern.
- (Original) The method of claim 6, wherein the heating causes refractive index 8. changing reactions in regions of the medium where the exposing activated photo-sensitizer molecules dispersed in the medium.
- (Original) The method of claim 6, wherein the heating includes heating the medium 9. to a temperature of a rubber-like phase.
- (Original) The method of claim 6, wherein the heating produces a pattern of 10. refractive index changes that is periodic and non-constant in three independent directions.

11. (Original) A photo-sensitive composition, comprising:

a medium capable of undergoing a refractive index changing chemical reaction, the medium further comprising:

photo-sensitizer molecules dispersed in the medium, the photo-sensitizer molecules to stimulate photo-chemical reactions in response to being exposed to light, products of the photo-chemical reactions being able to stimulate the refractive index changing chemical reaction; and neutralizer molecules dispersed in the medium, the neutralizer molecules being able to neutralize a portion of the products of the photo-chemical reactions.

- 12. (Previously presented) The composition of claim 11, wherein one of the products and the neutralizer molecules is an acid and the other of the products and the neutralizer molecules is a base.
- 13. (Previously presented) The composition of claim 11, wherein the medium is a photoresist having a rubber-like phase, the index changing reactions being inhibited or prevented at temperatures below a transition temperature for the phase.

14. (Currently Amended) A method for making crystalline structures and devices, comprising:

providing a medium with photo-sensitizer molecules dispersed therein, the photosensitizer molecules to catalyze photo-chemical reactions in response to being activated by light of a wavelength, products of the photo-chemical reactions being able to stimulate refractive index changes in the medium; and

exposing the medium to an optical interference pattern that is produced by combining a plurality of mutually coherent beams of light of the wavelength, the exposing being done under conditions that inhibits or prevents inhibit or prevent the products of the photo-chemical reactions from causing the refractive index changes.

- 15. (Original) The method of claim 14, wherein the providing a medium includes providing a medium with a concentration of molecules to neutralize a portion of the products, the neutralized portion of the products being unable to cause refractive index changes in the medium.
- 16. (Original) The method of claim 14, further comprising: heating the exposed medium to stimulate the products to cause refractive index changes in the medium.
- 17. (Original) The method of claim 16, wherein the photo-sensitizer molecules are visible dye molecules and the products cause polymerization, deprotection, or crosslinking reactions in the medium in response to the heating.

- 18. (Original) The method of claim 16, wherein the heating produces an interconnected open polymerized structure.
- 19. (Previously presented) The method of claim 1, wherein the photo-sensitize medium comprises both photo-sensitizer molecules and photo-acid generator molecules dispersed therein.
- 20. (Previously presented) The method of claim 14, wherein the medium further comprises photo-acid generator molecules dispersed therein.
- 21. (Previously presented) The composition of claim 11, wherein the medium further comprises photo-acid generator molecules dispersed therein.
- 22. (Previously presented) The method of claim 1, wherein the optical intensity pattern is produced by exposing the medium to visible light.
- 23. (Previously presented) The method of claim 1, wherein the optical intensity pattern is produced by exposing the medium to visible light ranging from 470 nm to 560 nm.
- 24. (Previously presented) The composition of claim 11, wherein the photo-sensitizer molecules are activatable by visible light.

- 25. (Previously presented) The composition of claim 11, wherein the photo-sensitizer molecules are activatable by visible light ranging from 470 nm to 560 nm.
- 26. (Previously presented) The method of claim 14, wherein the light is of a visible wavelength.
- 27. (Previously presented) The composition of claim 14, wherein the wavelength of light ranges from 470 nm to 560 nm.